REMARKS

The Office Action mailed 8 October 2002 has been received and considered. Presently, claims 1, 2, and 5-9 stand rejected under 35 USC 103(a) over Naito et al in view of Suzuki et al. By this amendment applicant has effected several amendments to claim 1 and furthermore has introduced a series of new claims which more clearly define the instant invention. Claims 2 and 5-9 have been cancelled thereby rendering their rejection moot.

Applicant respectfully submits that the amendments to claim 1 distinguish the invention of claim 1 over the two cited references. As amended claim 1, as well as claims 10-31, includes the requirement of an electrode plate fixed to a second surface of the piezoelectric element. Furthermore, the claims also require a flexible plate fixed to the electrode plate wherein the flexible plate includes a flexible substrate, a conductor arranged on part of the flexible plate in electrical connection to the electrode plate and a reinforcement arranged on the flexible substrate at a position that is off of the conductor.

Applicant respectfully submits that neither the Naito et al. reference or the Suzuki et al. reference either individually or in combination teach or suggest these newly added claim limitations. In the absence of a teaching or suggestion of these limitations in the cited references, applicant respectfully submits that claims 1 and 10-31 satisfy the requirements of 35 USC 103(a). Withdrawal of the rejection of claim 1 is respectfully requested. Furthermore, examination of claims 10-31 is requested.

Claims 3 and 4 are rejected under 35 USC 103(a) over Naito et al in view of Suzuki et al and Tsukada. Claims 3 and 4 have been cancelled by this amendment thereby rendering their rejection moot.

Claims 7 and 8 are rejected under 35 USC 103(a) over Suzuki et al. Claims 7 and 8 have been cancelled by this amendment thereby rendering their rejection moot.

CONCLUSION:

Applicant respectfully requests reconsideration of the instant application in view of the amendments indicated above. Further, the applicant requests examination of claims 10-31 newly submitted herewith.

Respectfully submitted,

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APPENDIX A

VERSION OF REPLACEMENT ABSTRACT TO SHOW CHANGES MADE

ABSTRACT OF THE DISCLOSURE

[An ultrasonic motor includes a stator having a piezoelectric element and a rotor facing the stator. The piezoelectric element vibrates the stator to rotate the rotor. A lining member is located between the rotor and the stator. A spring is installed in the motor. The spring is deformed by a predetermined amount to press the rotor against the stator. The force of the spring pressing the rotor changes in accordance with the deformation of the spring. The spring is installed such that its deformation is in a predetermined range, so that, within the range, the urging force of the spring changes by a relatively small amount for a given change of deformation. Therefore, when deformation of the spring changes due to wearing of the lining member, the urging force of the disk spring scarcely changes. Accordingly, the rotation characteristics of the motor scarcely change over time.]

An ultrasonic motor includes a stator having a piezoelectric element and a rotor facing the stator. The piezoelectric element is annular and is polarized into segments in the circumferential direction. A flexible plate is fixed to the piezoelectric element with an electrode plate in between. The flexible plate includes a flexible substrate, a conductor, and a reinforcement. The conductor is located on a part of the flexible substrate to be electrically connected to the electrode plate. The reinforcement is located on the flexible substrate at a position that is off the conductor. The reinforcement suppresses vibration generated at a part of the piezoelectric element that is off the conductor, thereby stabilizing vibration of the piezoelectric element in the circumferential direction.

APPENDIX B

VERSION OF REPLACEMENT CLAIMS TO SHOW CHANGES MADE

1. (Twice amended) An ultrasonic motor [including a stator, a rotor facing the stator, and a piezoelectric element for vibrating the stator to rotate the rotor, the stator comprising:

a disk-like diaphragm; and

radially extending teeth, the number of which is odd, formed on the diaphragm, wherein each o the teeth has a contact, which contacts the rotor, wherein the piezoelectric element vibrates the teeth such that the contacts produce progressive waves to rotate the rotor, wherein a radial slit is defined by each pair of adjacent teeth such that the slit opens to both axial sides of the diaphragm, and wherein the number of the slits is odd and the slits are spaced apart at equal angular intervals] , comprising:

a stator having an annular piezoelectric element, wherein the piezoelectric is polarized into a plurality of segments along the circumference;

a rotor arranged to face the stator, wherein the piezoelectric element vibrates the stator such that the rotor is rotated, and wherein the piezoelectric element has a first surface facing the stator and a second surface opposite from the first surface;

an electrode plate fixed to the second surface of the piezoelectric element; and

a flexible plate fixed to the electrode plate, wherein the flexible plate includes:

a flexible substrate;

a conductor arranged on part of the flexible substrate to be electrically connected to the electrode plate; and

a reinforcement arranged on the flexible substrate at a position that is off the conductor.

2. Cancelled.
3. Cancelled.
4. Cancelled,
5. Cancelled.
6. Cancelled.

7. Cancelled.

8. Cancelled.

9. Cancelled.

10. (New) The motor according to claim 1, wherein the reinforcement is formed such that the rigidity of the flexible plate changes at an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

11. (New) The motor according to claim 1, wherein the reinforcement reinforces the flexible substrate at positions spaced by an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

12. (New) The motor according to claim 1, wherein the conductor suppresses vibration generated at a portion of the piezoelectric element that corresponds to the conductor, and wherein the reinforcement suppresses vibration generated at a portion of the piezoelectric element that is off the conductor, thereby stabilizing vibration of the piezoelectric element in the circumferential direction.

13. (New) The motor according to claim 1, wherein the reinforcement includes a plurality of balancing portions and a plurality of connecting portions, wherein the balancing portions are spaced by a predetermined interval in the circumferential direction of the piezoelectric element, and wherein each connecting portion connects an adjacent pair of the balancing portions.

14. (New) The motor according to claim 13, wherein the conductor suppresses vibration generated at a portion of the piezoelectric element that corresponds to the conductor, and wherein the balancing portions suppress vibration generated at a portion of the piezoelectric

element that is off the conductor, thereby stabilizing vibration of the piezoelectric element in the circumferential direction.

15. (New) The motor according to claim 14, wherein the connecting portions are thinner than the balancing portions in respect of the radial direction of the piezoelectric element so that the connecting portions do not hinder vibration of the piezoelectric element.

16. (New) The motor according to claim 13, wherein the balancing portions are arranged at an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

17. (New) The motor according to claim 13, wherein the balancing portions and the connecting portions are integrally formed.

18. (New) The motor according to claim 1, wherein the flexible plate further includes a cover portion that partly covers the conductor, and wherein the cover portion is formed of the same material as the reinforcement.

19. (New) The motor according to claim 1, wherein the segments of the piezoelectric element include a group of A-phase segments and a group of B-phase segments, wherein high frequency voltages of different phases are applied to the A-phase segment group and the B-phase segment group, respectively, wherein the electrode plate includes an A-phase electrode corresponding to the A-phase segment group and a B-phase electrode corresponding to the B-phase segment group, wherein the conductor includes an A-phase conductor member corresponding to the A-phase electrode and a B-phase conductor member corresponding to the B-phase electrode, and wherein each of the A-phase conductor member and the B-phase conductor member has an end portion that contacts only a part of the corresponding one of the A-phase electrode and the B-phase electrode.

20. (New) The motor according to claim 19, wherein each end portion includes a base portion and a comb-like portion, wherein the base portion extends along the circumferential direction of the piezoelectric element, and wherein the comb-like portion extends outward from the base portion in respect of the radial direction of the piezoelectric element.

21. (New) The motor according to claim 19, wherein the segments of the piezoelectric element further include a feedback segment located between the A-phase segment group and the B-phase segment group, wherein the electrode plate futher includes a feedback electrode corresponding to the feedback segment, wherein the conductor further includes a feedback conductor member contacting the feedback electrode and a grounding conductor member surrounding the feedback conductor member, and wherein the A-phase conductor member and the B-phase conductor member are located outside of the grounding conductor member.

22. (New) A flexible plate fixed to a piezoelectric element with an electrode plate in between, the piezoelectric element including a plurality of polarized segments, the flexible plate comprising:

a flexible substrate;

a conductor arranged on part of the flexible substrate to be electrically connected to the electrode plate; and

a reinforcement arranged on the flexible substrate at a position that is off the conductor.

23. (New) The flexible plate according to claim 22, wherein the reinforcement is formed such that the rigidity of the flexible plate changes at an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

24. (New) The flexible plate according to claim 22, wherein the reinforcement reinforces the flexible substrate at positions spaced by an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

25. (New) The flexible plate according to claim 22 wherein the conductor suppresses vibration generated at a portion of the piezoelectric element that corresponds to the conductor, and wherein the reinforcement suppresses vibration generated at a portion of the piezoelectric element that is off the conductor, thereby stabilizing vibration of the entire piezoelectric element.

26. (New) The flexible plate according to claim 22, wherein the reinforcement includes a plurality of balancing portions and a plurality of connecting portions, wherein the balancing portions are spaced by a predetermined interval in a direction along which the piezoelectric element extends, and wherein each connecting portion connects an adjacent pair of the balancing portions.

27. (New) The flexible plate according to claim 26, wherein the conductor suppresses vibration generated at a portion of the piezoelectric element that corresponds to the conductor, and wherein the balancing portion suppresses vibration generated at a portion of the piezoelectric element that is off the conductor, thereby stabilizing vibration of the entire piezoelectric element.

28. (New) The flexible plate according to claim 27, wherein the connecting portions are thinner than the balancing portions so that the connecting portions do not hinder vibration of the piezoelectric element.

29. (New) The flexible plate according to claim 26, wherein the balancing portions are arranged at an interval that corresponds to one or half wavelength of vibration generated by the piezoelectric element.

30. (New) The flexible plate according to claim 26, wherein the balancing portions and the connecting portions are integrally formed.

31. (New) The flexible plate according to claim 22, wherein the flexible plate further

includes a cover portion that partly covers the conductor, and wherein the cover portion is formed of the same material as the reinforcement.